

**WHAT IS CLAIMED IS:**

1. A volume data encoder for encoding volume data that are image data having a three-dimensional spatial pixel arrangement, the volume data encoder comprising:

5       a two-dimensional transform unit for conducting two-dimensional frequency decomposition on two-dimensional consecutive images;

          skip detection means for detecting the same data portion which can be skipped in the frequency decomposition and encoding  
10   processing, when further conducting one-dimensional frequency decomposition and subsequent encoding processing on transform coefficients obtained from the two-dimensional transform unit;

          a one-dimensional transform unit for conducting the one-dimensional frequency decomposition except the portion  
15   detected by the skip detection means which can be skipped; and

          an encoding processing unit for conducting encoding on data subjected to the frequency decomposition in the one-dimensional transform unit, except the portion which can be skipped.

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2. The volume data encoder according to claim 1, further comprising storage means for storing a result of detection conducted by the skip detection means.

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3. The volume data encoder according to claim 1,

comprising:

a unit block division unit for dividing inside of a subband block, which is obtained by conducting three-dimensional frequency decomposition on volume data obtained by conducting  
5 the two-dimensional and one-dimensional transform, into unit blocks, which are smaller three-dimensional blocks; and

adaptive encoding means for conducting adaptive encoding on each of the unit blocks with a suitable encoding parameter.

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4. The volume data encoder according to claim 2, comprising:

a unit block division unit for dividing inside of a subband block, which is obtained by conducting three-dimensional  
15 frequency decomposition on volume data obtained by conducting the two-dimensional and one-dimensional transform, into unit blocks, which are smaller three-dimensional blocks; and

adaptive encoding means for conducting adaptive encoding on each of the unit blocks with a suitable encoding parameter.

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5. The volume data encoder according to claim 3, comprising:

means for calculating statistical values of coefficients  
25 for each of all unit blocks in the subband;

means for classifying the unit blocks into classes according to the statistical values; and

means for storing a result of the classifying,  
wherein the adaptive encoding means uses a common encoding  
parameter for each of the classes when encoding unit blocks.

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6. The volume data encoder according to claim 4,  
comprising:

means for calculating statistical values of coefficients  
for each of all unit blocks in the subband;

10 means for classifying the unit blocks into classes  
according to the statistical values; and

means for storing a result of the classifying,  
wherein the adaptive encoding means uses a common encoding  
parameter for each of the classes when encoding unit blocks.

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7. The volume data encoder, comprising means for  
compressing information held in the detection result storage,  
means according to claim 2 and the classifying result storing  
20 means according to claim 5,

wherein the compressed information is added to encoded  
data.

25 8. The volume data encoder according to claim 1, comprising  
means for separating header information from pixel information,  
if information other than the pixel information accompanies each

of a plurality of two-dimensional images forming the volume data,  
as the header information,

wherein the header information is processed apart from  
the pixel information, and a result of compression using a common  
5 portion of a plurality of kinds of header information is added  
to encoded pixel data.

9. The volume data encoder according to claim 2, comprising  
10 means for separating header information from pixel information,  
if information other than the pixel information accompanies each  
of a plurality of two-dimensional images forming the volume data,  
as the header information,

wherein the header information is processed apart from  
15 the pixel information, and a result of compression using a common  
portion of a plurality of kinds of header information is added  
to encoded pixel data.

20 10. The volume data encoder according to claim 3,  
comprising means for separating header information from pixel  
information, if information other than the pixel information  
accompanies each of a plurality of two-dimensional images forming  
the volume data, as the header information,

25 wherein the header information is processed apart from  
the pixel information, and a result of compression using a common  
portion of a plurality of kinds of header information is added

to encoded pixel data.